IN THE CLAIMS

1. (original) A method for manufacturing thin-film electrochemical devices comprising the steps of

forming an anode layer;

applying an electrolyte layer to one face of said anode layer, and around said anode layer's edges;

applying a cathode layer to a portion of the exposed face of said electrolyte layer, leaving a gap extending from the edge of said face radially inward;

applying an interconnect layer to said anode layer, covering the entire exposed surface of said anode layer; and

applying an interconnect layer to said cathode layer, and to the remaining exposed electrolyte layer, covering the exposed surface of the electrolyte layer

2. (original) The method of claim 1 wherein said anode layer comprises a Ni/yttria stabilized zirconia cermet.

3. (previously presented)The method of claim 1 wherein said electrolyte layer comprises a material selected from a group consisting of yttria stabilized zirconia, a mixed ion and electron conductor, and a composite of a metal and an ion conductor.

4. (original) The method of claim 1 wherein said cathode layer comprises a composite of strontium-doped lanthanum manganite.

5. (original) The method of claim 1 wherein said cathode layer comprises yttria stabilized zirconia.

6. (previously presented)The method of claim 1 wherein said interconnect layer comprises a material selected from a group consisting of metal, alloy, and ceramic.

7. (original) The method of claim 1 wherein said forming an anode layer comprises tape casting.

8. (original) The method of claim 1 wherein said applying an electrolyte layer comprises a thin-film deposition technique.

9. (previously presented)The method of claim 8 wherein said thin-film deposition technique comprises a technique selected from a group consisting of aqueous spray deposition, tape casting, co-casting onto said anode layer, thermal spray, plasma spray, and directed vapor deposition.

10. (original) The method of claim 1 wherein said applying a cathode layer comprises a thin-film deposition technique.

11. (original) The method of claim 10 wherein said thin-film deposition technique comprises screen printing.

12. (original) The method of claim 1 wherein said applying an interconnect layer comprises a thin-film deposition technique.

13. (previously presented)The method of claim 12 wherein said thin-film deposition technique comprises a technique selected from a group consisting of thermal spray, directed vapor deposition, plasma spray, tape-casting, and co-casting onto a porous catalyst layer.

14. (original) The method of claim 1 wherein said applying an interconnect layer comprises applying over a removable core.

15. (original) The method of claim 1 wherein said applying an interconnect layer comprises applying over a shaped form.

16. (original) The method of claim 1 wherein said applying an interconnect layer comprises a ceramic-to-metal joining technique.

17. (previously presented)The method of claim 16 wherein said ceramic-to-metal joining technique comprises a technique selected from a group consisting of transient liquid phase bonding and brazing.

18. (original) The method of claim 1 further comprising applying a buffer layer between a pair of layers.

19. (original) The method of claim 18 wherein said buffer layer is applied between an interconnect layer and another layer.

20. (original) The method of claim 1 wherein said anode and said cathode layer comprise porous catalyst layers.

21 (previously presented)The method of claim 20 wherein said porous catalyst layers comprise a material selected from a group consisting of a mixed ion and electron conducting ceramic and a composite of metal and an ion conducting ceramic.

22. (original) The method of claim 20 wherein said porous catalyst layers are formed by a thin-film deposition technique.

23. (previously presented)The method of claim 22 wherein said thin-film deposition technique comprises a technique selected from a group consisting of tape-casting, screen printing, thermal spray, and plasma spray.

24. (currently amended) An apparatus for use as a thin-film electrochemical device comprising

an anode layer;

an electrolyte layer ~~on~~ in contact with one face of said anode layer, and around edges of said anode layer;

a cathode layer formed on a portion of an exposed face of said electrolyte layer, with a gap extending radially inward from edges of said electrolyte layer;

a first interconnect layer on said anode layer; and

a second interconnect layer on said cathode layer and remaining exposed electrolyte layer, covering the exposed surface of the electrolyte layer.

25. (original) The apparatus of claim 24 wherein said anode layer comprises a Ni/yttria stabilized zirconia cermet.

26. (original) The apparatus of claim 24 wherein said electrolyte layer comprises yttria stabilized zirconia.

27. (original) The apparatus of claim 24 wherein said cathode layer comprises a composite of strontium-doped lanthanum manganite and yttria stabilized zirconia.

28. (original) The apparatus of claim 24 wherein an interconnect layer is metallic.

29. (original) The apparatus of claim 24 further comprising a buffer layer between a pair of said layers.

30. (original) An apparatus comprising a plurality of thin-film electrochemical devices of the apparatus of claim 24 bonded together.

31. (currently amended) ~~The apparatus of claim 30 wherein said bonding comprises~~ An apparatus comprising a plurality of thin-film electrochemical devices, each comprising

an anode layer;

an electrolyte layer on said anode layer;

a cathode layer on said electrolyte layer;

a first interconnect layer on said anode layer; and

a second interconnect layer on said cathode layer;

wherein two or more layers are bonded together by a technique comprising transient liquid phase bonding.

32. (currently amended) ~~The apparatus of claim 30 wherein said bonding comprises~~ An apparatus comprising a plurality of thin-film electrochemical devices, each comprising

an anode layer;

an electrolyte layer on said anode layer;

a cathode layer on said electrolyte layer;

a first interconnect layer on said anode layer; and

a second interconnect layer on said cathode layer;

wherein two or more layers are bonded together by a technique comprising brazing.

33. (original) The apparatus of claim 24 wherein said anode and cathode layers comprise porous catalyst layers.

34. (original) The apparatus of claim 33 wherein said porous catalyst layers comprise a mixed ion and electron conducting ceramic.

35. (original) The apparatus of claim 33 wherein said porous catalyst layers comprise a composite of a metal and an ion conducting ceramic.

36. (original) The apparatus of claim 24 wherein said electrolyte layer comprises a mixed ion and electron conductor.

37. (original) The apparatus of claim 24 wherein said electrolyte layer comprises a composite of a metal and an ion conductor.

38. (original) The apparatus of claim 24 wherein said interconnect layers comprise ceramic.

39. (currently amended) ~~The apparatus of claim 30 wherein said plurality of thin-film electrochemical devices are~~ An apparatus comprising a plurality of thin-film electrochemical devices, each comprising

an anode layer;

an electrolyte layer on said anode layer;

a cathode layer on said electrolyte layer;

a first interconnect layer on said anode layer; and

a second interconnect layer on said cathode layer;

wherein two or more layers are bonded together by a technique comprising ceramic-ceramic bonding.

40. (currently amended) A method of manufacturing stacks of thin-film electrochemical devices comprising the step of connecting a plurality of sequentially connected base units that each contain: ~~apparatus of claim 24.~~

an anode layer;

an electrolyte layer in contact with one face of said anode layer, and around edges of said anode layer;

a cathode layer formed on a portion of an exposed face of said electrolyte layer, with a gap extending radially inward from edges of said electrolyte layer;

a first interconnect layer on said anode layer; and

a second interconnect layer on said cathode layer and remaining exposed electrolyte layer, covering the exposed surface of the electrolyte layer.

41. (previously presented)The method of claim 40 wherein said connecting comprises a technique selected from a group consisting of ceramic-ceramic bonding, transient liquid phase bonding, and brazing.

42. (new) The method of claim 1 wherein the step of applying an interconnect layer to said anode layer, covering the entire exposed surface of said anode layer, comprises the step of applying an interconnect layer to said anode layer, covering the entire exposed surface of said anode layer and interfacing with one or more edges of the electrolyte layer.

43. (new) The apparatus of claim 31 further comprising a buffer layer between a pair of said layers.

44. (new) The apparatus of claim 31 wherein said anode and said cathode layers comprise porous catalyst layers.

45. (new) The apparatus of claim 44 wherein said porous catalyst layers comprise a mixed ion and electron conducting ceramic.

46. (new) The apparatus of claim 44 wherein said porous catalyst layers comprise a composite of a metal and an ion conducting ceramic.

47. (new) A method for manufacturing thin-film electrochemical devices comprising the steps of

forming an anode layer that has a face and at least one edge surface;

applying an electrolyte layer to the face of the anode layer and around the edge surface to seal the anode layer and present an exposed face of the electrolyte layer;

applying a cathode layer to a first portion of the exposed face of said electrolyte layer, to leave a second portion of the exposed face that extends inwardly along the electrolyte layer towards the cathode layer;

applying an anode interconnect layer to the anode layer to provide an anode gas manifold structure and seal the anode layer where the anode gas manifold structure is absent; and

applying a cathode interconnect layer to the cathode layer to provide a cathode gas manifold structure and seal the cathode layer where the cathode gas manifold structure is absent.

48. (new) The method of claim 47, wherein:

the electrolyte layer presents an exposed face of the electrolyte layer and an electrolyte edge surface; and

the step of applying a cathode interconnect layer to the cathode layer to provide a cathode gas manifold structure and seal the cathode layer where the cathode gas manifold structure is absent, comprises applying a cathode interconnect layer to the cathode layer and to any portion of the exposed face of the electrolyte layer or the electrolyte edge surface, to provide a cathode gas manifold structure and seal the cathode layer where the cathode gas manifold structure is absent.

49. (new) The method of claim 47, wherein any of the steps of applying an electrolyte layer, applying a cathode layer, applying an anode interconnect layer or applying a cathode interconnect layer comprise a thin-film deposition technique.

50. (new) The method of claim 47, wherein either of the steps of applying an anode interconnect layer or applying a cathode interconnect layer comprise a ceramic-to-metal joining technique.